

## **REMARKS**

The Office Action of May 13, 2011 has been carefully studied. The following paragraphs correspond to the order of the paragraphs of the Office Action:

### ***Election/Restrictions***

Applicants acknowledge the finality of the restriction requirement wherein claims 3-11, 18-19, 21 and 23-24 are withdrawn from consideration and which provide Applicants with the possibility of filing one or more divisional applications directed thereto. Conversely, Applicants respectfully request reconsideration insofar as the finality of the restriction requirement may be premature, owing to the allowability of claims in addition to claims 20, 26 and 27 indicated as being directed to allowable subject matter on pages 15 and 16 of the Office Action.

### ***Claim Objections***

Claim 1 is corrected by inserting the term --acid-- after “oxalic” in line 6, not line 7.

### ***Claim Rejections – 35 U.S.C. 112 First Paragraph***

#### **Claim 1**

The word “it” is cancelled.

“The liquid phase” is now changed to --a liquid phase--.

Line 4 of claim 1 is now changed to “a step for electro-reduction of resultant liquid phase containing concentrated CO<sub>2</sub> or carbonic acid in an aprotic medium to oxalic acid or formic acid in which the carbon...”. It is believed clear that it is the carbon in the CO<sub>2</sub> or carbonic acid which is subjected to electro-reduction.

The expression “the form of” is now removed from the claim.

The term “new extracting” is now changed to --extracting--.

Line 6 is now clarified by inserting “said” before --oxalic acid or formic acid--, and changing “the” to --an-- before “aqueous phase”.

In line 8, the definition of “M” is now incorporated as being any metallic element with an oxidation number of +2, support being found on page 6, line 16 and “C” is now clarified --C is carbon--.

#### **Claim 2**

Line 2, the term “said” now modifies “CO<sub>2</sub>”.

#### **Claim 16**

The term “said” now modifies “oxalic acid”.

In line 2, the term “oxalate” is proper since it is stated now in claim 1 that the oxalic acid and formic acid are present in either the free or salt form.

#### **Claim 20**

The expression “the final mineralization step” is now changed to --a final mineralization step--.

In addition, claim 20 now requires the incorporation of “step (c)” from claim 1 wherein an aqueous solution of oxalic acid or formic acid is formed.

#### **Claim 22**

Line 2, the expression “the mineral formed” is now changed to --the mineral produced-- in accordance with the Examiner’s suggestion.

#### **Claim 26**

This claim is now amended in the same manner as claim 20.

New claim 28 is added which is specific to formic acid or formate.

#### ***Rejection of Claims Under 35 U.S.C. 112 Second Paragraph***

Referring to page 6 of the Office Action, asserting that there are omitted structural

cooperative relationships between steps (a) and (b)-(d)-, claim 1 is a generic claim which is intended to incorporate all the methods of liquid phase concentration which are described in Applicants' specification on page 4, starting at line 11 through page 5, line 12. For example, the CO<sub>2</sub> can be liquefied, dissolved, hydrated or formed into a decomposable amine salt.

Referring to page 7 of the Office Action, last complete paragraph, the carbon is not emitted into the atmosphere by Applicants' process, but is rather sequestered from the atmosphere. To avoid confusion, the expression "emitted into" is now changed to --in--.

Referring to page 8, Applicants do not understand the criticism set forth in the middle paragraph regarding the form of oxalic or formic acid. The paragraph bridging pages 5 and 6 of the specification is believed to be sufficiently informative.

Referring to the rejection of claims 15 and 25-27, again reference is made to page 5 of the specification which makes it clear that "concentrating CO<sub>2</sub> in a liquid phase" is a generic term which embraces --liquid CO<sub>2</sub> under pressure--.

With respect to the rejection of claim 17 on page 9 of the Office Action, this claim is amended by changing "a non-aqueous" to --an aprotic-- to be in conformance with claim 1.

The Examiner is thanked for the diligent review of the claims.

### ***Claim Rejections – 35 U.S.C. 103***

Inasmuch as claim 1 is now amended so as to recite a reaction of oxalic acid or formic acid with a carbonate of an element M, it appears that claim 1 is now in condition for allowance, noting in particular that the indication of allowable subject matter on page 15 of the Office Action provides an underlining of "carbonated mineral". In view of the apparent allowability of claim 1, it is respectfully submitted that it is proper to withdraw the election of species requirement and allow all the dependent claims.

For the record, the cited references do not suggest Applicants' invention for the following reasons:

Abbott et al. ("Electrochemical Reduction of CO<sub>2</sub> in a Mixed Supercritical Fluid"), J. Phys. Chem. B (2000), Vol. 104, pp. 775-779.

This reference provides a comprehensive review of the electro-reduction of CO<sub>2</sub> with various electrolytes and electrodes, including the use of CO<sub>2</sub> in the supercritical state wherein water was formerly utilized as a polar modifier. The article provides a new system wherein 1,1,1,2-tetrafluoroethane (HFC 134a) is used as a polar modifier in supercritical mixtures. In the experimental section starting at the bottom of page 776, the apparatus utilizes the electrolyte tetrabutyl ammonium tetrafluoro borate (last paragraph on right hand column), as well as a platinum electrode. The conclusion of the article as set forth on the right hand column of page 778 is that the use of the electrode and an aprotic mixture in the supercritical state realized dramatically improved faradaic efficiency in oxalate formation at the platinum electrode.

There is no suggestion in this reference of any further steps aside from producing oxalate or formate.

#### *Chemical Abstracts (CS 11531)*

This reference teaches a system for liberating sequestering agents, especially ethylene diamine tetra acidic acid (EDTA) from liquids containing such sequestrates by adding calcium in the form of oxalic acid or an oxalate in the presence of a mineral acid. The resultant calcium oxalate is removed from solution by slow crystallization. Thus, this reference does not suggest or even hint at the removal of CO<sub>2</sub> from the atmosphere, and it is courteously submitted that this reference would not in any way, in combination with the above discussed primary reference make Applicants' invention obvious to one of ordinary skill in the art.

In view of the present comprehensive amendment, it is respectfully submitted that it is entirely proper for the Examiner to withdraw the restriction requirement and allow all the claims at issue.

Finally, Applicants note for the record that Applicants' Information Disclosure Statement has been considered on May 9, 2011.

If there are any remaining issues which have not been addressed, the Examiner is courteously requested to telephone Counsel at the number indicated below, but if Counsel is unavailable, please contact Ms. Richardson at 703-812-5326, and she will be pleased to enlist the

services of another attorney so as to expeditiously place the case in condition for allowance if not already.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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